

REMARKS

The Final Office Action mailed on May 22, 2003, has been received and reviewed.

Claims 23-27, 29-35, 40-51, and 53-64 are currently under consideration in the above-referenced application.

Claims 1-22, 36-39, 52, and 65-69 have been withdrawn from consideration as being drawn to a nonelected species.

Each of claims 23-27, 29-35, 40-51, and 53-64 stands rejected.

Reconsideration of the above-referenced application is respectfully requested.

Rejections Under 35 U.S.C. § 102(e)

Claims 23, 24, 27, 29, 40, 45, 46, 48, 49, and 59 stand rejected under 35 U.S.C. § 102(e) as being anticipated by the subject matter described in U.S. Patent 6,545,365 to Kondo et al. (hereinafter "Kondo").

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single reference which qualifies as prior art under 35 U.S.C. § 102. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Kondo describes, at col. 2, line 66, to col. 3, line 13, and with reference to FIG. 4, a method for assembling semiconductor devices such that bond wires 3a protruding from a lower semiconductor device 3 to not contact or electrically short with a back side of a next-higher semiconductor device 6 or bond wires 6a extending from the next-higher semiconductor device 6. The method includes positioning a bonding layer 7 on an active surface of the lower semiconductor device 3 and positioning an insulating tape 9 on the bonding layer 7 and over bond wires 3a that extend from the lower semiconductor device 3. When the next-higher semiconductor device 6 is positioned over the lower semiconductor device 3, the insulating tape 9 becomes sandwiched between the bonding layer 7 and a back side of the next-higher semiconductor device 6. Kondo explains that the configuration of the insulating tape 9 and its

arrangement over the bond wires 3a that extend from the lower semiconductor device 3 prevents short-circuiting between the bond wires 3a and both the back side of the next-higher semiconductor device 6 and the bond wires 6a that extend from the next-higher semiconductor device 6.

Kondo does not, however, expressly or inherently describe that, when semiconductor device 6 is positioned, it is stably supported by the bond wires 3a that extend from the lower semiconductor device 3. Rather, it is apparent from the disclosure of Kondo that any contact between bond wires 3a and insulating tape 9 is merely incidental.

Independent claim 23, as proposed to be amended herein, recites a method for assembling semiconductor devices that includes positioning a second semiconductor device over a first semiconductor device and at least partially over intermediate conductive elements that extend over the first semiconductor device. When a second semiconductor device is so positioned, a back side of the second semiconductor device contacts at least some of the intermediate conductive elements and is stably supported thereby, while remaining electrically isolated from the intermediate conductive elements.

As Kondo lacks any express or inherent description of an assembly method that includes positioning semiconductor device 6 at least partially over bond wires 3a so as to be stably supported thereby, it is respectfully submitted that Kondo does not anticipate each and every element of amended independent claim 23. It is, therefore, respectfully submitted that, under 35 U.S.C. § 102(a), amended independent claim 23 is allowable over Kondo.

Each of claims 24, 27, 29, and 40 is allowable, among other reasons, as depending either directly or indirectly from claim 23, which is allowable.

Independent claim 45, as proposed to be amended herein, recites a method for assembling semiconductor devices in a stacked arrangement. The resulting stacked arrangement has a height which is substantially equal to combined thicknesses of each of the stacked semiconductor devices and the distances that discrete conductive elements that are associated therewith protrude above each of the stacked semiconductor devices. The method of amended independent claim 45

includes, among other things, positioning a second semiconductor device at least partially over a first semiconductor device and on at least some discrete conductive elements that extend over the first semiconductor device. Amended independent claim 45 also recites that the second semiconductor device is positioned so as to be stably supported by at least some of the discrete conductive elements.

Again, Kondo neither expressly nor inherently describes that semiconductor device 6 thereof is positioned over bond wires 3a so as to be stably supported thereby. Rather, any contact between the insulating tape 9 on the back side of semiconductor device 6 and the underlying bond wires 3a appears to be merely incidental. Therefore, it is respectfully submitted that Kondo does not anticipate each and every element of amended independent claim 45 and, thus, that, under 35 U.S.C. § 102(e), amended independent claim 45 is allowable over Kondo.

Claims 46, 48, 49, and 59 are each allowable, among other reasons, as depending either directly or indirectly from claim 45, which is allowable.

For these reasons, it is respectfully requested that the 35 U.S.C. § 102(e) rejections of claims 23, 24, 27, 29, 40, 45, 46, 48, 49, and 59 be withdrawn.

Rejections Under 35 U.S.C. § 103(a)

Claims 23-27, 29-35, 40-51, and 53-64 stand rejected under 35 U.S.C. § 103(a).

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Lee in View of Foster and Farnworth

Claims 23-27, 29-35, 40-51, and 53-64 stand rejected under 35 U.S.C. § 103(a) as being obviousness over the teachings of Lee, in view of the subject matter taught in U.S. Patent to 6,437,449 Foster (hereinafter “Foster”) and U.S. Patent 5,012,323 to Farnworth (hereinafter “Farnworth”).

Lee teaches a process for forming a multi-chip module. That process includes, among other things, securing a first semiconductor chip 21 to a substrate 20. FIG. 1; col. 5, lines 5-7. Bond pads 210 of the first semiconductor chip 21 are electrically connected to corresponding terminals (not shown) of the substrate 20 by bond wires 22. FIG. 1; col. 5, lines 7-10. A so-called “reverse wire-bonding technique” is employed so as to minimize the distance that the bond wires 22 protrude above the active surface of the first semiconductor chip 21. Col. 5, lines 10-21. Next, an electrically insulative adhesive layer 23 is applied over the first semiconductor chip. FIG. 1; col. 5, lines 22-25. The adhesive layer completely surrounds the bond wires 22. FIG. 1; col. 5, lines 25-32. A second semiconductor chip 24 is then positioned over the first semiconductor chip 21 and secured thereto by way of the adhesive layer 23. *Id.*

Foster teaches a process for assembling semiconductor devices that includes, among other things, securing a spacer 116 to an active surface of a first semiconductor die 108, forming a conductive wire 124 over the spacer 116, forming a layer 146 of electrically conductive adhesive material 146 over the spacer 116 and the conductive wire 124. The electrically conductive adhesive material of layer 146 secures a second semiconductor die 140 is secured in place over the first semiconductor die 108.

Farnworth teaches, among other things, a semiconductor device 41 which includes an insulative coating 42 on the entire back side thereof. Farnworth also teaches that the semiconductor device 41 may be used in stacked multi-chip modules.

It is respectfully submitted that there are at least two reasons why a *prima facie* case of obviousness under 35 U.S.C. § 103(a) is not supported by the asserted combination of Lee, Foster, and Farnworth.

*Foster Teaches Away from Both the Claimed Subject Matter and
the Asserted Combination of References*

First, it is respectfully submitted that Foster teaches away from both the subject matter recited in the claims of the above-referenced application and the asserted combination of teachings therefrom with those of Lee.

By teaching, at col. 4, lines 45-51, that an end 130 of the conductive wire 124 is embedded in the electrically conductive adhesive material of layer 146, Foster teaches that the back side of the second semiconductor die 140 thereof and the conductive wire 124 that underlies the same are in electrical communication with one another.

In contrast, independent claims 23 and 45 both require that, upon positioning a second semiconductor device at least partially over a first semiconductor device, the back side of the second semiconductor device and intermediate conductive elements that underlie the same are electrically isolated from each other. Thus, Foster's teaching that the back side of semiconductor die 140 and the underlying conductive wire 124 are in electrical communication with each other teaches away from the requirement of independent claims 23 and 45 that the back side of the second semiconductor device be electrically isolated from underlying intermediate conductive elements.

Moreover, Lee teaches (*see, e.g.*, col. 3, lines 37-42) that the non-active surface, or back side, of an upper semiconductor die is electrically isolated from underlying bond wires. Thus, by teaching that conductive wire 124 contacts the back side of second semiconductor die 140, the teachings of Foster in are direct conflict with those of Lee.

No Motivation to Combine

Second, it is respectfully submitted that one of ordinary skill in the art would not have been motivated to combine the teachings of Lee, Foster, and Farnworth in the manner that has been asserted. Notably, M.P.E.P. § 2141.02 requires that the teachings of prior art references be considered in their entireties, "including portions that would lead away from the claimed invention." When the teachings of Lee, Foster, and Farnworth are considered in their entireties,

it is clear that one of ordinary skill in the art would not be motivated to combine their teachings, as Lee and Farnworth both teach isolating the back side of a semiconductor device from bond wires or other intermediate conductive elements thereunder, while Foster requires that a conductive wire 124 contact and communicate electrically with a back side of an overlying semiconductor device 140.

No Reasonable Expectation of Success

Third, it is respectfully submitted that one of ordinary skill in the art would have no reason to expect that the asserted combination of teachings from Lee, Foster, and Farnworth would successfully result in the methods that are recited in the claims of the above-referenced application.

Again, *all* of the teachings of Lee, Foster, and Farnworth *must* be considered.

Foster teaches that a conductive wire 124 contacts and communicates electrically with a back side of an overlying semiconductor device 140. If a non-conductive adhesive layer of the type taught in Lee (*see, e.g.*, col. 3, lines 37-42) of the insulative coating 42 of Farnworth were to be disposed between the conductive wire 124 and the back side of the semiconductor device 140, such communication would not be possible.

Conversely, if the conductive wire 124 of Foster were to contact the back side of an overlying semiconductor device of the assemblies of Lee or Farnworth, the back side of the overlying semiconductor device would not be electrically isolated from the conductive wire 124, as required by Lee and Farnworth.

Therefore, the asserted combination of teachings from Lee, Foster, and Farnworth would not result in the methods that are recited in the claims of the above-referenced application, nor would one of ordinary skill in the art have any reason to expect that it would.

For these reasons, it is respectfully submitted that a *prima facie* case of obviousness has not been established against any of claims 23-27, 29-35, 40-51, or 53-64. As such, it is

respectfully submitted that, under 35 U.S.C. § 103(a), each of these claims is allowable over the asserted combination of teachings from Lee, Foster, and Farnworth.

Foster in View of Farnworth

Claims 23 and 45 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the teachings of Foster, in view of those of Farnworth.

It is respectfully submitted that, for the same reasons that have been provided above, Foster teaches away from the subject matter recited in claims 23 and 45, as well as from that taught in Farnworth, one ordinary skill in the art would not have been motivated to combine the teachings of Foster and Farnworth, and one of ordinary skill in the art would have no reason to expect that a combination of the teachings of Foster and Farnworth would be successful.

Therefore, a *prima facie* case of obviousness has not been established against either claim 23 or claim 45.

In view of the foregoing, it is respectfully requested that the 35 U.S.C. § 103(a) rejections of claims 23-27, 29-35, 40-51, or 53-64 be withdrawn.

ENTRY OF AMENDMENTS

It is respectfully submitted that the claim amendments that are proposed herein should be entered because they are supported by the as-filed specification and drawings and they do not add any new matter to the above-referenced application. Further, it is respectfully submitted that the proposed claim amendments reduce the number of issues that remain for purposes of appeal. Finally, if it is determined that the proposed claim amendments do not place the above-referenced application in condition for allowance, entry thereof is respectfully requested upon filing of a Notice of Appeal in the above-referenced application.

Election of Species Requirement

As claims 23 and 45 are both allowable and remain generic to each of the species of invention that were identified in the Election of Species Requirement, it is respectfully requested that each of claims 1-22, 25, 26, 36-39, 52, and 65-69, which have been withdrawn from consideration in the above-referenced application, also be allowed.

CONCLUSION

It is respectfully submitted that each of claims 23, 24, 27, 29-35, 40-46, 48-51, and 53-64, which have been considered, as well as each of claims 1-22, 25, 26, 36-39, 52, and 65-69, which have been withdrawn from consideration as being drawn to a nonelected species, is allowable. An early notice of the allowability of each of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,



Brick G. Power
Registration No. 38,581
Attorney for Applicant
TRASKBRITT, PC
P.O. Box 2550
Salt Lake City, Utah 84110-2550
Telephone: 801-532-1922

Date: July 14, 2003

BGP/jml:djp

Document in ProLaw